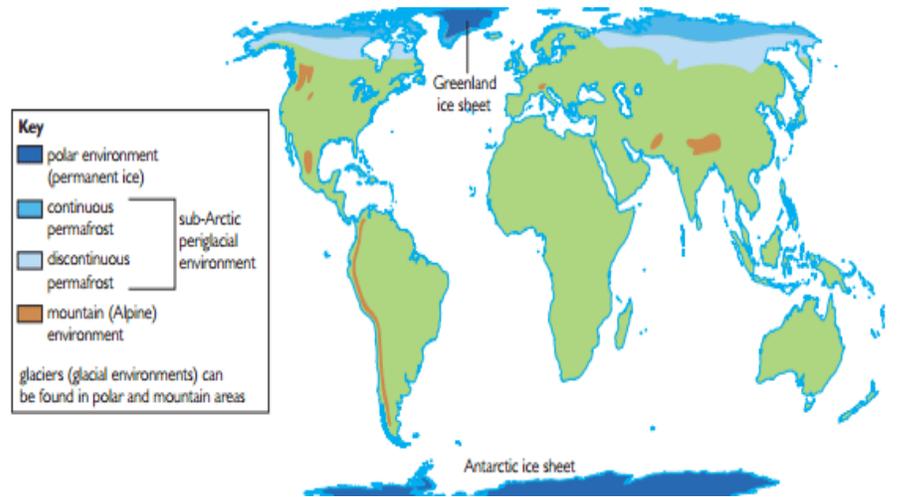


# Distribution of cold environments



Polar areas (N and S poles) are covered by ice sheets and have no soil. Tundra (where temperatures are rarely above 0°C and experience permafrost conditions). Have thin, acidic soil with poor fertility.

## Case study Cold environments : Alaska and the north slope : Opportunities

Alaska is a state of the USA and borders the northern Arctic areas of Canada. There are many opportunities for economic development in the area.

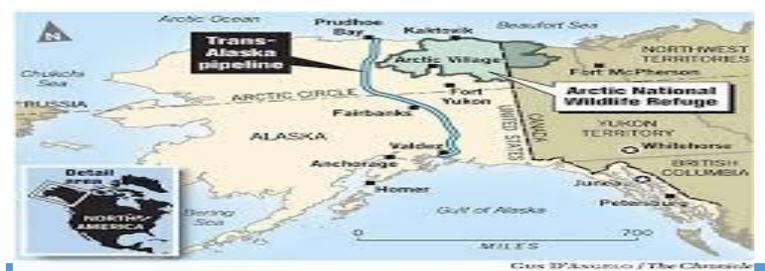
**OIL and Gas :** Oil field such as Prudhoe bay provide 50% of Alaska's income. The Trans-Alaskan oil pipeline links the Oil fields with Valdez where Oil can be shipped abroad to other countries

Mineral resources such as gold, silver, iron ore are mined and contribute \$2.2 billion to Alaska's GDP.

Fishing (Salmon, Pollock) employs 80,000 people and \$5 billion to the economy.

Tourism – wilderness tourism attracts 2 million visitors a year providing money and employment

## The Living World Cold environments

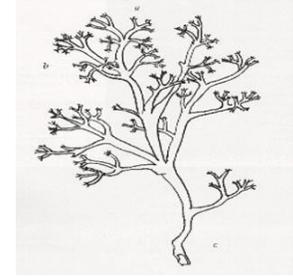
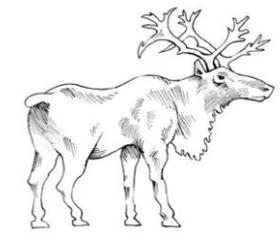


Challenges Alaska	
Alaska's population is small and most live on the coast in the SE and S of the state where it is warmer	
Extreme temperatures and strong winds lead to very difficult conditions as well as short daylight hours in the winter months when it is dark for upto 24 hrs	
Alaska is a long way from anywhere and can only be reached by air or dangerous Ice roads	
The ground is prone to subsidence as the permafrost melts in the summer- this makes the construction of buildings very dangerous	
As a result the pipeline and electricity lines are built above the ground on stilts	

## Characteristics of Cold environments

Polar	Tundra
Temps normally below freezing and down to -90°C	Temps normally between +10°C to ---50°C. Normally a layer of permanently frozen ground called permafrost
Plants : a few lichens and mosses, grow slowly and are small	
Animals; Polar bears (north pole), Penguins(south Polar regions),whales , seals.	Animals; Polar bears (north pole), Herbivores like Deer and Caribou graze on limited vegetation
People – Almost uninhabited except for a few scientists (Antarctica)	Indigenous people (many thousands) and oil and gas workers(Siberia and Northern Canada and Alaska

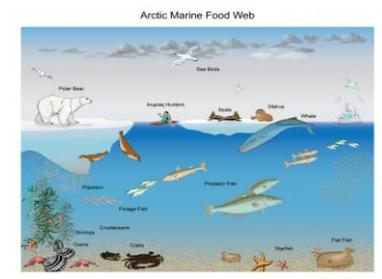
## Biodiversity :plant and animal adaptations



Ecosystem	Biodiversity Cold environments have low biodiversity
Plants gain nutrients from soil, and these nutrients are grazed by animals. They spread the seed through dung	Plants lay dormant to survive winter months.. Plants have shallow roots due to permafrost below. Leaves are small to limit moisture loss. Summers very short so growing season only 50 to 60 days
Slow plant growth (cold, poor soils, low light intensity), soil poor in nutrients.	Animals well insulated – thick fur coats (Polar bears) or blubber like Seals. Some animals hibernate like arctic squirrels.
Fragile ecosystem easily disturbed by human activity such as oil exploration (tundra)	Many birds migrate to warmer climates during winter e.g. arctic Terns. Some animals white fur for camouflage e.g. Arctic fox.

## Conflict in Alaska : Balancing the needs of economic development and conservation of habitats and wildlife.

There are concerns that the development of the oil industry in Northern Alaska is having a detrimental impact on the migration of Caribou across the North slope and into Alaska. The oil pipeline has blocked the ability of the Caribou to migrate to their feeding grounds. This has also affected indigenous groups like the Vantuk people as well as conservation areas like the Arctic National Wildlife Refuge (ANWR)



## Alaskan conflict?